

# Quantifiable and Reliable Structural Health Management Systems, Phase II

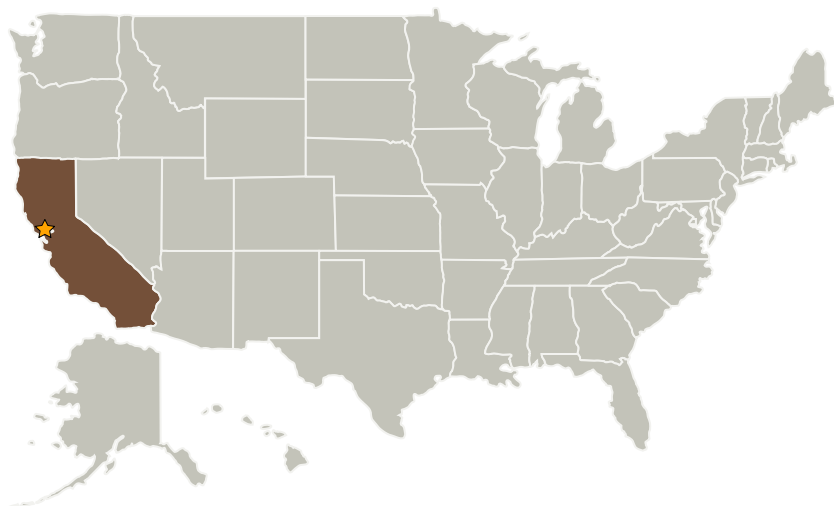
Completed Technology Project (2009 - 2011)



## Project Introduction

Under Project Constellation, NASA is developing a new generation of spacecraft for human spaceflight. A significant percentage of the structures used in these spacecraft will be made of composite materials, and the Ares V payload shroud will be one of the largest composite structures ever built. This offers many challenges, not only for design and manufacturing, but also for inspection and maintenance. Inspection of large composite structures using traditional NDE methods is time consuming, expensive, and often not possible when access is limited (e.g. covered by a thermal protection system), resulting in a conservative (higher weight) design. Acellent proposes to develop a robust, state-of-the-art structural health monitoring (SHM) system to overcome these concerns. The Phase II will optimize the design and quantify the benefits for SHM on the Ares V payload shroud, and then expand the results to include other Ares V components such as the Altair Lunar Lander Structure, Earth Departure Stage (EDS) payload adapter, forward skirt and intertank, and the Core-to-EDS interstage. The proposed solution will be capable of detecting and quantifying damage with a high probability of detection (POD), accurately predicting the residual strength and remaining life of the structures with confidence, and providing information that will allow appropriate preventative actions on the monitored structure.

## Primary U.S. Work Locations and Key Partners



Quantifiable and Reliable  
Structural Health Management  
Systems, Phase II

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## Organizational Responsibility

### Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

### Lead Center / Facility:

Ames Research Center (ARC)

### Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★ Ames Research Center(ARC)	Lead Organization	NASA Center	Moffett Field, California
Acellent Technologies, Inc.	Supporting Organization	Industry Small Disadvantaged Business (SDB), Women-Owned Small Business (WOSB)	Sunnyvale, California

## Primary U.S. Work Locations

California

## Project Transitions

**March 2009:** Project Start**November 2011:** Closed out

## Project Management

**Program Director:**

Jason L Kessler

**Program Manager:**

Carlos Torrez

## Technology Areas

**Primary:**

- TX12 Materials, Structures, Mechanical Systems, and Manufacturing
  - └ TX12.4 Manufacturing
    - └ TX12.4.5 Nondestructive Evaluation and Sensors